IN THE CLAIMS

1-29. (Withdrawn).

30-51. (Cancelled).

52-73. (Withdrawn).

74. (Currently Amended) A substrate structure for neurite outgrowth, comprising:

~~- a basic structure;~~

~~- at least one neuron on top of said basic structure;~~

~~- at least one alignment layer or a combined alignment layer, said combined alignment layer comprised of monomeric or polymeric materials having liquid crystalline and/or amorphous elements; and~~

~~- a mono- or multilayer of liquid crystal material on said at least one alignment layer,~~

~~wherein said polymeric material is selected from the group consisting of polyester, polypeptide, polyacrylamide, polyvinyl alcohol, polyacrylate, polymethacrylate, polyurea and polyamide~~

- a basic substrate; and

- an alignment layer or a combined alignment layer on said basic substrate, wherein said alignment layer is comprised of a mono- or multi-layer of liquid crystal material, wherein said combined alignment layer is comprised of at least one azosilane or of a polymeric material selected from the group consisting of polyester, polypeptide, polyacrylamide, polyvinylalcohol, polyacrylate, polymethacrylate, polyurea and polyamide, and wherein at least one neuron is on top of said mono- or multilayer of liquid crystal material or on top of said combined alignment layer.

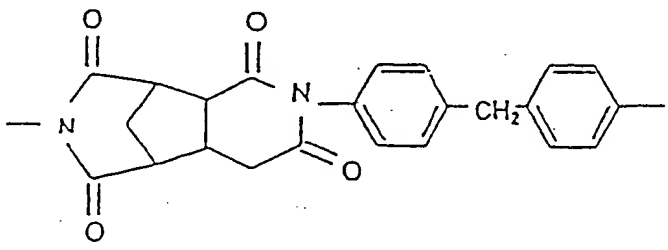
75. (Previously Presented) The substrate structure according to claim 74, wherein said basic substrate comprises a glass substrate.

76. (Previously Presented) The substrate structure according to claim 75, wherein said glass substrate is covered with a conductive layer or an electrode arrangement.

77. (Previously Presented) The substrate structure according to claim 76, wherein said at least one alignment layer is a polymeric alignment layer.

78. (Previously Presented) The substrate structure according to 76, wherein said at least one alignment layer is a polyimide.

79. (Previously Presented) The substrate structure according to claim 78, wherein said polyimide is represented by the following repeat unit:



80. (Previously Presented) The substrate structure according to claim 74, wherein said liquid crystal material is 4-Octyl-4-biphenyl carbonitrile and/or 4-Pentyl-4-biphenyl carbonitrile.

81. (Previously Presented) The substrate structure according to claim 74, wherein said at least one alignment layer has a thickness from 10 to 200 nm.

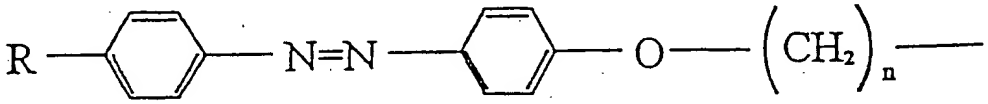
82. (Previously Presented) The substrate structure according to claim 74, wherein said at least one alignment layer has a thickness of about 100 nm.

83. (Previously Presented) The substrate structure according to claim 74, wherein said liquid crystal material has a thickness from 10 to 150 nm.

84. (Previously Presented) The substrate structure according to claim 74, wherein said liquid crystal material has a thickness of about 100 nm.

85. (Previously Presented) The substrate structure according to claim 74, wherein that said polymeric material has at least one azobenzene chromophore covalently attached thereto.

86. (Previously Presented) Substrate structure according to claim 85, wherein said azobenzene chromophore is represented by the formula:



wherein R is selected from the group consisting of CN, NO_2, OCH_3, H, CH_3, $(CH_2)_3CH_3$, F, Cl, Br, CF_3, C_6H_5, $O(CH_2)_2OCH_3$ and $(CH_2)_5CH_3$, and wherein n is selected from the range: $0 \leq n \leq 12$.

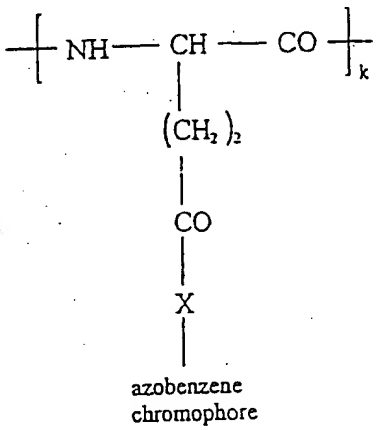
87. (Previously Presented) The substrate structure according to claim 74, wherein said polyester is a side chain liquid-crystalline polyester.

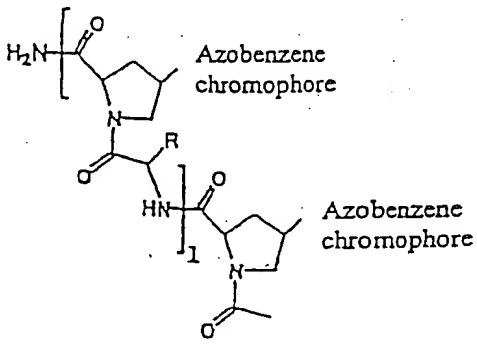
88. (Previously Presented) The substrate structure according to claim 87, wherein said side chain liquid-crystalline polyester is an azobenzene side chain liquid-crystalline polyester.

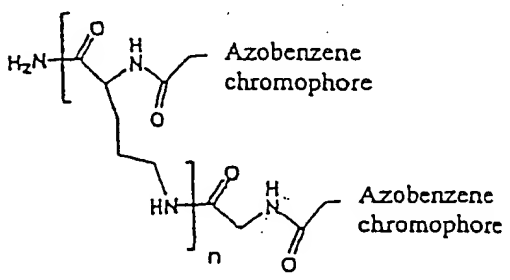
89. (Previously Presented) The substrate structure according to claim 88, wherein said azobenzene side chain liquid-crystalline polyester is a Pxnm-polyester selected from the group consisting of P6a12, P6a10, P8a10, P10a10, P8a12 and P10a12, wherein x is a para-substituent, n is the number of methylene groups in a flexible side chain spacer and m is the number of methylene groups in an acidic part of a main chain.

90. (Previously Presented) The substrate structure according to claim 74, wherein said polypeptide is selected from the group consisting of polyglutamate, polyproline and polyornithine.

91. (Previously Presented) The substrate structure according to claim 90, wherein said polypeptide is selected from the group consisting of:

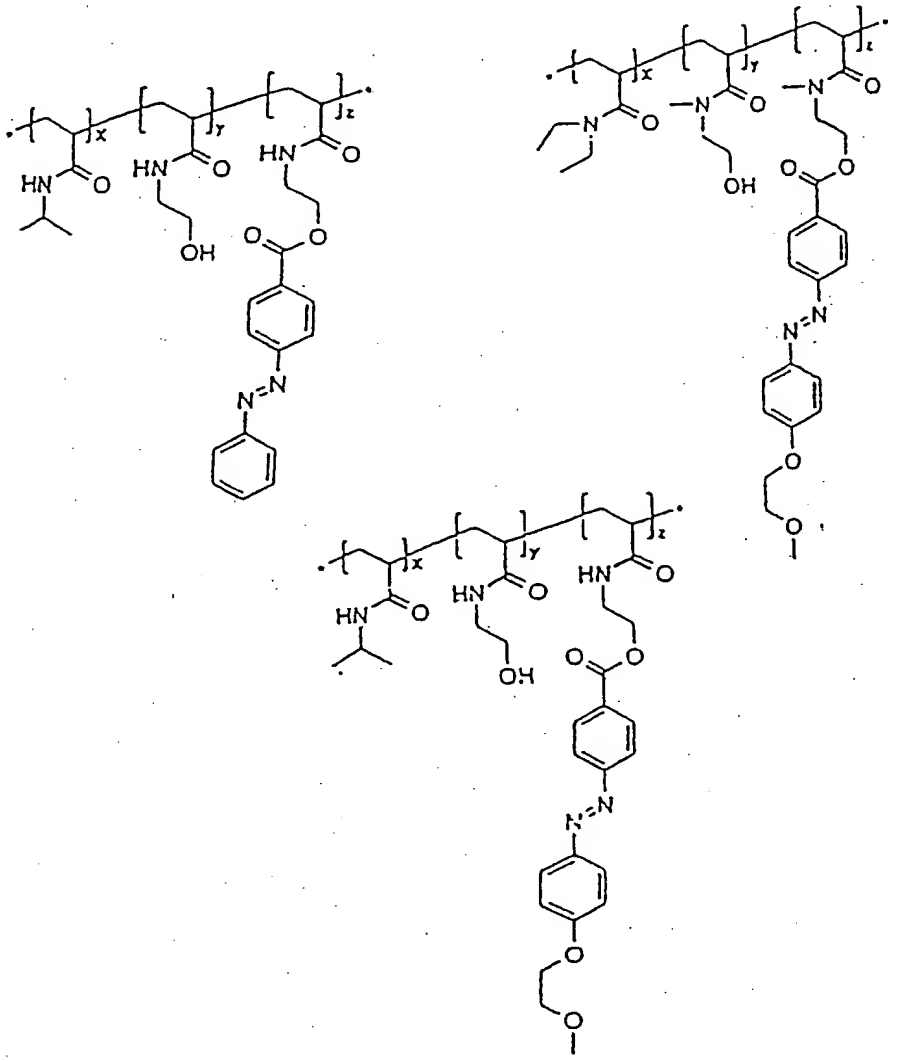






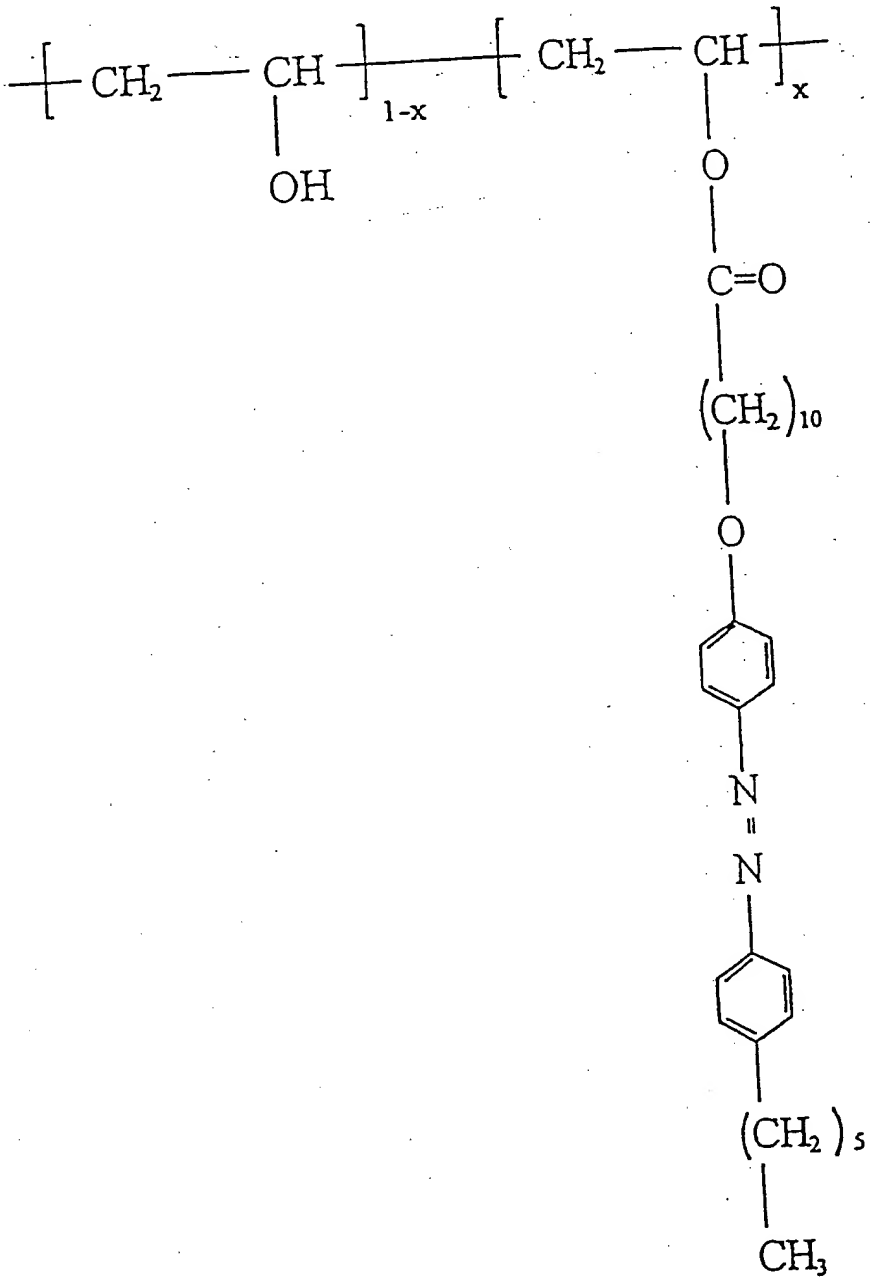
wherein X is selected from the group consisting of NH and O, the azobenzene chromophore is defined as in claim 86, and wherein k, n and 1 are selected from the range: $1 \leq (k \text{ or } 1 \text{ or } n) \leq 500$.

92. (Previously Presented) The substrate structure according to claim 74, wherein said polyacrylamide is selected from the group consisting of:



wherein x is selected from the range: $0.2 \leq x \leq 1$, y is selected from the range: $0.1 \leq y \leq 1$, z is selected from the range: $0.005 \leq z \leq 0.025$, and $x + y + z = 1$ for all combinations of x. y and z.

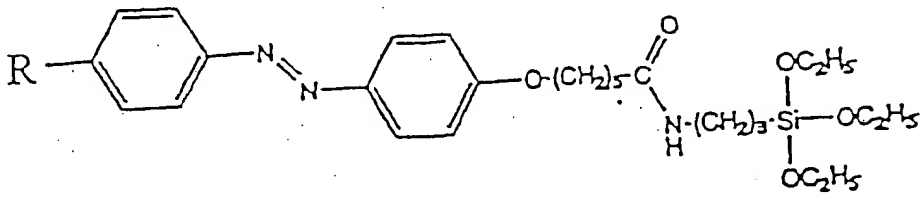
93. (Previously Presented) The substrate structure according to claim 74, wherein said polyvinyl alcohol is selected from the group consisting of:



wherein x is selected from the range: $0.2 \leq x \leq 0.6$.

94. (Previously Presented) The substrate structure according to claim 74, wherein said combined alignment layer comprises at least one type of azosilane.

95. (Previously Presented) The substrate structure according to claim 94, wherein said at least one type of azosilane is of the formula:



wherein R is selected from the group consisting of CN, NO_2, OCH_3, H, CH_3, $(CH_2)_3CH_3$, F, Cl, Br, CF_3, C_6H_5, $O(CH_2)_2OCH_3$ and $(CH_2)_5CH_3$.

96. (Previously Presented) The substrate structure according to claim 74, wherein said combined alignment layer has a thickness of 20 nm to 350 nm.

97. (Previously Presented) The substrate structure according to claim 74, wherein said combined alignment layer has a thickness of 200 nm.